

We claim:

- 5 1. A process for preparing chlorine by catalytic gas-phase oxidation of hydrogen chloride, which comprises the steps:
- a) providing a feed gas stream I comprising hydrogen chloride and a feed gas stream II comprising oxygen;
- 10 b) in a first oxidation stage, feeding the feed gas stream I, the feed gas stream II, if desired a recycle stream Ia comprising hydrogen chloride and if desired an oxygen-containing recycle stream IIa into a first oxidation zone and bringing them into contact with a first oxidation catalyst so that a first partial amount of the hydrogen chloride is oxidized to chlorine and a gas stream III comprising chlorine, unreacted oxygen, unreacted hydrogen chloride and water vapor is obtained;
- 15 c) in a second oxidation stage, feeding the gas stream III into a second oxidation zone and bringing it into contact with at least one further oxidation catalyst so that a second partial amount of the hydrogen chloride is oxidized to chlorine and a product gas stream IV comprising chlorine, unreacted oxygen, unreacted hydrogen chloride and water vapor is obtained;
- 20 d) isolating chlorine, if desired the recycle stream Ia and if desired the recycle stream IIa from the product gas stream IV,
- 25 wherein the first oxidization catalyst in the first oxidation zone is present in a fluidized bed and the further oxidation catalyst or catalysts in the second oxidation zone is/are present in a fixed bed.
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2. A process as claimed in claim 1, wherein the temperature in the first oxidation zone is from 280 to 360°C and that in the second oxidation zone is from 220 to 320°C.
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3. A process as claimed in claim 1 or 2, wherein the second oxidation zone comprises only one fixed-bed reactor.
4. A process as claimed in any of claims 1 to 3, wherein the second oxidation zone has only one temperature zone.
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5. A process as claimed in any of claims 1 to 4, wherein the oxidation catalysts comprise ruthenium oxide on a support selected from among silicon dioxide, aluminum oxide, titanium dioxide and zirconium dioxide.
- 5 6. A process as claimed in any of any claims 1 to 5, wherein step d) comprises the steps:
- 10 d1) separating off hydrogen chloride and water from the product gas stream IV to give a gas stream V comprising chlorine and oxygen;
- d2) drying the gas stream V;
- 15 d3) separating off an oxygen-containing stream from the gas stream V and, if desired, recirculating at least part of it as oxygen-containing recycle stream IIa to the first oxidation zone, leaving a chlorine-containing product stream VI;
- 20 d4) if appropriate, further purifying the chlorine-containing product stream VI.